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Concerns about medication and medication adherence in patients with chronic  
pain recruited from general practice

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## Abstract

This study examines the concerns and beliefs about medication reported by patients with non-malignant chronic pain encountered within general practice. Two hundred and thirty-nine patients with chronic pain took part in this research. Patients completed the Pain Medication Attitudes Questionnaire (PMAQ), a measure of patient concerns and beliefs relating to addiction, withdrawal, side-effects, mistrust in doctors, perceived need of medication, scrutiny from others, and tolerance. The data revealed that patient concerns and beliefs predicted general medication non-adherence. In addition, concerns were related to the direction of non-adherence: overuse of medication was related to increased perceived need for medication and greater concern over side effects; underuse was related to decreased concerns over withdrawal and increased mistrust in the prescribing doctor. Analyses also indicated that patient attitudes and concerns about medication were more predictive of non-adherence than both level of pain and the reported frequency of experienced side effects. This research contributes to the increasing evidence that patient attitudes and beliefs about pain medication are associated with adherence behavior. Training general practitioners to identify and address these concerns may reduce concerns, improve adherence, and facilitate the doctor-patient relationship.

## 1. Introduction

Chronic non-malignant pain presents physicians with challenges, including symptoms that often defy clear etiology and diagnosis. Appropriate treatment may include a complex combination of rehabilitative, psychological and behavioral methods. Medication remains, however, the most common component of treatment. Despite a consensus on the value of analgesic prescription in primary care [10,13], ineffective treatment, including undertreatment [3,6], remains a significant problem.

Patient adherence to prescribed medication may present additional complications. Medication adherence is necessary for the accurate assessment of treatment effectiveness and for the overall management of a patient's package of care. Both over and underuse of analgesic medication can reduce the effectiveness of pain management. Non-adherence to prescribed medication by chronic pain patients is common [2,4] and may have many different causes [2].

Both physicians and patients report concerns about the impact of medication [10,12]. The patient's concerns, however, may provide the key to more effective medication use for chronic pain. A study in secondary and tertiary care by McCracken, Hoskins and Eccleston [8] illustrated that patients' concerns about medication predicted both the extent and direction of non-adherence, whether that be over or underuse. Understanding and addressing the concerns of the patient may increase adherence, which in turn may reduce physician's own concerns about the impact of medication on patients.

In contrast to specialty care, primary care encompasses a broader range of patients with diverse treatment histories. Despite primary care

typically being the initial and most frequent point of contact for chronic pain patients the primary care experience remains under-researched [16]. The concerns of patients seen in primary care cannot be assumed to be equivalent to those in specialist care because their levels of distress and disability differ, their treatment histories differ, and the level of training in pain management of the administering physician is often very different. Compared with specialist physicians, General Practitioners may experience higher levels of medication concerns [11], which are associated with reports of insufficient training about chronic non-malignant pain [7,17]. Given the importance of the patient-practitioner relationship the concerns of the GP may exacerbate those of the patient. Thus, investigation of the concerns of chronic non-malignant pain patients encountered in primary care appears essential to (a) inform and better equip primary care practitioners, (b) guide treatment to diminish the patient's concerns, (c) improve medication adherence, and (d) reduce physician concerns.

The aim of this study was to extend previous research into the associations between the concerns of chronic non-malignant pain patients about medication and non-adherence. Whereas previous investigation has focused on the concerns of patients receiving specialist care [8], this study focuses on the broader range of patients encountered within general practice. As in earlier studies it was predicted that patients' concerns about medication for pain would correlate with their patterns of medication use. Underuse of medication, which is often omitted from research, as well as overuse, were both assessed as patterns of non-adherence [2].

## 2. Method

## 2.1. Participants

Two hundred and thirty-nine patients with chronic pain took part in this research. Participant demographic information is summarized in Table 1.

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Table 1  
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Over a third (37.6%) of the participants were either working part time, retired or not working because of their pain; 41.8% of the participants received benefits, of which the most common were Income Support and Disabled Living Allowance. The sample of participants in this study was identical to the sample in a previously published study [9] although the variables of primary interest are completely separate.

## 2.2. Procedure

This study was approved by the local ethics committee. Chronic non-malignant pain patients were contacted through 20 GPs from 10 primary care practices throughout South West England. A computer records search by each practice was conducted to find chronic pain patients. Each GP wrote to between 20-40 chronic pain patients (CPPs) asking for their permission to be contacted directly by the research team from the Centre for Pain Research (N=664). Three hundred and twenty-three (48.6%) of the CPPs agreed to be contacted directly. Using standard mail survey methods questionnaires were sent to these 323 CPPs. One follow-up reminder was sent to non-responders. Completed questionnaires and written consent forms were received from 239. Therefore, the overall response rate was 36% of those originally contacted by

their GP, perhaps due to the employment of a very conservative recruitment strategy.

## 2.3. Measures

### 2.3.1 Pain Medication Attitudes Questionnaire [8]

Concerns and beliefs about pain medication were assessed using the PMAQ, a 47-item questionnaire including seven subscales: Concerns about addiction, concerns about withdrawal, concerns over side effects, mistrust in doctors, perceived need of medication, concerns over scrutiny from others, and worries about tolerance. Items are rated on a 6-point numerical scale (0=never true to 5=always true); nine items are reversed scored; and the subscales are mean scores of relevant items. Internal consistency reliability for these subscales is adequate based on Cronbach's alpha values ranging from .77 to .85 [8]. Validity was demonstrated in the previous study through significant predicted relations between the subscales and measures of medication use, disability, and emotional distress.

Patient demographic information and pain and treatment history were collected. Participants' pain intensity was assessed by an 11-point numerical rating scale using the anchors 'no pain' and 'worst pain possible'. Medication information (both prescription and non-prescription medication), dosage, and frequency of use were also collected.

Medication adherence was assessed by replicating the method employed by McCracken and colleagues [8]. Similar to previous self-report approaches to adherence assessment, a series of brief questions were employed to assess general use rather than use of specific medication, to allow comparison across participants who typically have varying medication

combinations [5]. First, underuse of medication was assessed by participant response to two questions about the frequency with which they take less medication than prescribed and miss doses respectively. Similarly, participants were asked two questions relating to frequency of taking more medication than prescribed and taking extra doses to assess overuse of medication. Participants responded to these medication use questions on a 5-point scale (0=never, 4=always); underuse and overuse scores were the mean values across the two respectively question pairs. Second, general non-adherence was the accumulative score across all four questions. Therefore, each participant received three continuous variable ratings of non-adherence: general, underuse and overuse. The item pairs demonstrated adequate to good internal consistency for underuse ( $\alpha = .61$ ) and overuse ( $\alpha = .86$ ) respectively. There was no correlation between items of under and over use (*all ps* > .69).

Finally, participants reported the frequency of ten common adverse effects of analgesics (i.e., drowsiness, impaired concentration, nausea, constipation, rash, dry eyes, agitation, dizziness, confusion, and headache). For ease of comprehension these were described using the more common term “side effects”. In what follows we report this more common term to reflect the question asked.

### 3. Results

#### 3.1 Patient Report of Pain

Patients reported a median pain duration of 10 years (range 0.33 – 50 years). Ninety-four percent of the participants judged their pain to be a long term problem and 64.0% of the participants experienced their pain constantly.



The mean present pain intensity rating was 5.2 (SD=2.5); and the mean 'usual intensity over the last week' was 6.1 (SD=2.3). Most participants (99.2%) gave at least one reason for their pain, the most common one was osteoarthritis (53.1%). Approximately half did not know a cause for pain (49.4%); of those who did, just under a quarter (24.0%) cited accident. Thirty-seven percent of the participants had undergone an operation relating to their pain; of those, 38.2% had undergone one surgical operation, 26.9% had two, and 35.0% had three or more.

### 3.2. Patterns of Analgesic Use

Participants reported being prescribed between one and 21 different medications; with a modal response of two (mean=4.3, SD=3.0). The most commonly reported medication types were weak opioids (67.4%), followed by prescribed NSAIDs (50.6%), over-the-counter (OTC) medications (primarily including paracetamol; 36.8%), tricyclic antidepressants (19.2%), anticonvulsants (8.8%), and strong opioids (8.4%). The separation of weak and strong opioids was employed as this is a common classification of these types of medications; it should be acknowledged, however, that medication strength is also contingent on dosage [1].

Patient responses regarding adherence were examined initially to understand the extent of deviation from prescription instruction. Although 75.6% of participants indicated that they took medication exactly as their physician instructed in response to the direct yes or no question "do you take your medication exactly as prescribed?", when further questioned almost half the participants indicated that they either take less medication (47.6%) and/or miss prescribed doses at least some of the time (52.0%). Approximately a

quarter of the participants also stated that they either take more, or take an extra dose of medication at least some of the time, 23.5% and 30.4%, respectively. The average rate of reported non-adherence across four questions relating to medication use was 38.4%; 18.8% reported instances of both under and over use.

When asked to specify a reason for either taking less, or missing a dose of medication, just under a third of patients cited “low level of pain,” 31.8%, 18.4% cited “forgetting”, and 13.4% cited “concern about side effects” as the reason. Only very small numbers of participants cited “worries about the medication losing its effectiveness” (7.5%), “addiction or dependence” (7.1%), “what people may think” (0.4%) or “cost of medication” (0.8%) as reasons for taking less medication than prescribed.

When analyzing the responses of those patients who stated that they sometimes take more, or take an extra dose of medication, most participants endorsed the reason “too much pain to tolerate” (33.9%); a small percentage cited the reasons “to help cope with a particular task” (7.5%), “have to do something and have no alternative” (2.1%), “feeling emotionally upset” (1.3%), “feeling unsure” (0.8%), or having “an urge to take it” (0.4%).

3.3. PMAQ Item and Patterns of Use Analyses

Correlation analyses were conducted to explore the relations between patient concerns, level and direction of non-adherence, and frequency of side effects experienced. The correlation coefficients are presented in table 2.

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Table 2  
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Higher levels of general non-adherence were associated with increased concerns about medication side effects and developing tolerance and addiction, as well as a greater mistrust in the prescribing doctor, and concern about scrutiny from others. Medication underuse was negatively associated with perceived need for medication and concerns over withdrawal, and positively associated with mistrust in the prescribing doctor. Both medication overuse and frequency of side effects experienced were positively related to all patient concerns examined.

Examining the relations between frequency of side effects experienced and non-adherence (general, over and under use) demonstrated a significantly positive correlation with overuse only. Overuse of medication was associated with increased frequency of side effects. Due to overuse and frequency of side effects being related to both each other and all examined patient concerns, a series of partial correlations controlling for frequency of side effects were conducted to clarify the associations between overuse and concern ( $N = 184$  in all cases, a reduction from the total sample size due to incomplete participant responses). These analyses reduced the number of significant positive correlations between overuse and patient concern to: concerns over side effects ( $r(181) = .18, p = .02$ ) and developing tolerance ( $r(181) = .25, p = .001$ ), as well as perceived need for medication ( $r(181) = .28, p < .001$ ). Furthermore, the same partial correlation method was employed to examine the other medication adherence variables and concern over side effects. The results demonstrated that concern over side effects remained positively associated with general non-adherence ( $r(181) = .21, p =$

.005) and overuse ( $r(181) = .18, p = .02$ ) even when accounting for actual occurrence of side effects.

Comparison of concerns dependent on whether the patient reported some opioid use demonstrated increased concern about addiction compared to those who did not use opioids ( $t(230) = 3.07, p = .002$ ). This comparison should be interpreted with caution, however, as it cannot account for the impact of the differing combinations of other medications taken by patients across these two groups.

3.4. Regression Analyses of PMAQ Scores in Relation to Medication Use

To examine combined and unique relations of the PMAQ scores with measures of medication adherence, we calculated a series of hierarchical multiple regression analyses. The criterion variables in these analyses were the three categories of medication adherence: general non-adherence, overuse, and underuse. In the first step of each equation level of pain was entered, in order to examine its ability to predict each of the outcome variables and to control variance attributable to pain. In the second step the scores for seven patient concerns and beliefs measured by PMAQ were entered, based on statistical criteria ( $p < .05$  to enter,  $p > .10$  to remove). Results of the three regression equations are provided in table 3.

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Table 3  
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Level of pain accounted for a significant increment of variance in underuse but

not overuse or general non-adherence. Lower levels of pain predicted more underuse. Other predictors of medication adherence differed dependent on direction of non-adherence. Underuse was positively predicted by mistrust of prescribing doctor and negatively predicted by concern about withdrawal. Overuse was positively predicted by perceived need for medication and concerns about side effects. The respective regression models explained 19.1% of variance in general non-adherence, 19.6% of variance in underuse of medication, and 18.9% of variance in overuse of medication.

An additional regression exploring general non-adherence was conducted substituting frequency of experienced side effects as a predictor in the place of the patient concern variables. The model was non-significant,  $F(2, 183) = 2.11$ ,  $p = .12$ ,  $R^2 = .02$ .

#### 4. Discussion

The primary purpose of this research was to examine concerns and beliefs about medication in patients with chronic pain treated in primary care, and to further examine their association with non-adherence to prescribed medication. Medication non-adherence has frequently been identified as an area of concern for prescribing General Practitioners, and it is presumed that patient concerns about medications may help explain and reduce non-adherence. The study findings offer support to this hypothesis and further propose that specific concerns may be related to particular patterns of non-adherence.

Consistent with previous reports [2], non-adherence was common. Dependent on the wording of the question, 23.5-52% of patients reported some degree of non-adherence. Furthermore, the present study supports

previous research suggesting that specific concerns about medication are predictive of both general non-adherence and direction of non-adherence [8].

Overall, the regression results were relatively consistent with the correlation coefficients. General non-adherence was associated with greater levels of mistrust in the prescribing doctor, greater concerns about potential side effects of the medication, and lower levels of concern about withdrawal from medication. On further analysis, patient concerns that were predictive of general non-adherence had specific relations with either over or under use, but not both. Underuse was associated with lower levels of perceived pain, lower levels of concern about withdrawal, and greater levels of mistrust in the doctor. Overuse was also associated with greater levels of concern about side effects and greater perceived need for medication. Perceived need for medication was the only factor that was predictive of specific pattern of non-adherence, namely overuse, but not general non-adherence. These results suggest two conclusions. First, general non-adherence to prescribed medication may be the result of patient concerns and attitudes towards their medication. Second, these concerns may not only influence whether the patient deviates from their prescribed course of medication, but also in what form this deviation manifests itself, in particular whether it results in an increase or decrease of consumption.

Those overusing medication report greater concern about side effects of medication; however, they also report an increased perceived need for the medication. Many individuals may consider medication to be essential whilst also having significant concerns about the impact the medication will have

upon them. It is possible that for some patients these conflicting attitudes may exacerbate concern and cause further distress.

The results also suggest that the positive association between concerns over side effects and both non-adherence and overuse persist irrespective of the actual frequency of side effects experienced. In addition, level of pain experienced explained the smallest amount of variance in all patterns of medication use, and was not a significant predictor of overuse or general non-adherence. These findings demonstrate further evidence that patient attitudes and concerns about medication appear to play a more significant role in determining non-adherence than actual physical experience of both pain and medication.

Of particular interest is the finding that greater mistrust in the prescribing doctor predicts underuse of medication. The patient-doctor relationship is an important component of treatment, one that is reliant on openness and trust [14]. In the present study 28.5% of patients reported concerns that their doctor was not adequately educating them on the nature of the medication being prescribed. This finding may indicate that some patient concerns are not being adequately addressed through interactions with the GP and the explanations provided; that medication concerns are not being reduced, and that trust may be compromised.

These patient concerns may reflect those expressed by GPs themselves. Primary care practitioner concerns relating to insufficient training about chronic non-malignant pain and appropriate treatment appear common [7,17]. These concerns reportedly impact on GP prescription behaviors [10,15,18], thus they are likely to also influence the satisfaction of the patient-

doctor interaction for both parties. Appropriate training and professional development to better equip GPs with the knowledge and expertise to treat chronic pain is required. Such a training program may diminish the concerns of the prescribing doctor. Furthermore, by addressing the relations between patient concerns and non-adherence exhibited in this research, practitioners may also be able to increase patient adherence. Non-adherence is an important issue as it undermines the treatment plan, can mislead subsequent treatment progression and frequently results in unwanted outcomes. Targeting patient concern is, therefore, potentially a vital component to adherence promotion.

The research findings are consistent with previous investigation within secondary and tertiary care [8], however, they also demonstrate some notable differences. First, within the broad range of patients encountered in general practice, receiving varying levels of treatment, the reported range of non-adherence was lower than the 36-75% previously reported in specialized care. This may suggest a greater instance of medication over and/or under use when considering patients receiving secondary and tertiary care, excluding primary care. Second, although patient concerns consistently predicted adherence across the studies, there was variation in the type and combination of these concerns. Additionally, with the exception of overuse, the predictive concerns of this sample of patients explained a greater percentage of variance in medication adherence. The results may indicate that stage of treatment (i.e., primary, secondary, tertiary) is related to different combinations of patient concerns influencing medication adherence. Further



research directly comparing patients at different stages of treatment is required to clarify these potential associations.

The study has some limitations. First, although the study extends previous investigations, sampling from primary care settings, the actual extent and type of care received by the patient was not assessed. The research, consequently, may display the differences in concerns of the broader sample in comparison with the specialist sample; however, the potential differences in predictive concerns of those at different stages of treatment (e.g. primary care versus secondary) cannot be determined. Second, the study design was cross-sectional and so causal relations between the assessed variables cannot be determined. Third, we measured medication behavior by self-report, so actual behavior was not sampled. Further research could also explore differences between concerns relating to immediate and long-term use; as well as adherence to different types of medication. Finally, the present methodology cannot account for changes in concern within the same patient that may lead to variation in medication non-adherence, changes that may lead to underuse in some circumstances and overuse in others.

## 5. Conclusion

This research contributes to the increasing evidence suggesting that patient concerns and beliefs about medication are associated with adherence behavior. In addition, direction of non-adherence was related to specific types of concern. Patient concerns appear more pivotal in determining non-adherence than both level of pain and frequency of side effects experienced. This study expands upon previous research in secondary and tertiary care settings and suggests that significant concerns are also present in the broad

range of patients encountered in primary care. A necessary step towards diminishing the concerns of both patient and practitioner, as well as increasing medication adherence, may involve additional training in the treatment of chronic non-malignant pain for those prescribing and dispensing analgesic medicines.

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Table 1. Demographic Characteristics of Study Participants.

		% <sup>*</sup>
Sex	Male	42.8
	Female	58.2
Age	Mean (SD)	61.46 (13.73) <i>years</i>
	Range	25-94 <i>years</i>
Marital status	Married	61.5
	Widowed	16.3
	Divorced	15.5
	Single	6.3
Ethnicity	White	95.8
	Other	1.2
	Undisclosed	3%
Employment	Full-time	13.4
	Homemaker	4.6
	Part-time	<i>due to pain</i> 1.7
		<i>not due to pain</i> 8.8
	Retired	<i>due to pain</i> 21.3
		<i>not due to pain</i> 31.4
	Not working	<i>due to pain</i> 14.6
		<i>not due to pain</i> 3.3

\* Actual percentage including non-responders

Table 2. Correlation Coefficients between Patient Concerns, Medication use, and Frequency of Side Effects Experienced.

		1	2	3	Frequency of side effects experienced	
<b>Medication use</b>						
	1. Non-adherence				.14	(184)
	2. Underuse	.75*** (216)			-.03	(187)
	3. Overuse	.68*** (216)	.02 (216)		.22**	(185)
<b>Concerns</b>						
	Addiction	.14* (216)	-.00 (220)	.21** (219)	.47***	(195)
	Perceived need	.02 (216)	-.26*** (220)	.32*** (219)	.36***	(195)
	Scrutiny	.18** (216)	.08 (220)	.17* (219)	.40***	(195)
	Side effects	.22** (216)	.03 (220)	.28*** (219)	.58***	(195)
	Tolerance	.17* (216)	-.07 (220)	.32*** (219)	.39***	(195)
	Mistrust in doctor	.31*** (216)	.22** (220)	.21** (219)	.25***	(195)
	Withdrawal	-.08 (216)	-.27*** (220)	.02* (219)	.44***	(195)

NOTE: N values are reported in parentheses; N ranges from 184-220 due to incomplete participant responses. Underuse and Overuse were measured based on to participant response to questions relating to direction of deviation from prescribed dose (0 = never; 4 = always); Non-adherence was evaluated based on the composite score of underuse and overuse; Frequency of side effects experienced was determined by the sum frequency of 10 common adverse responses to medication (0 = never; 4 = always).

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

Table 3. Multiple Regression Analyses of Medication Concerns and Medication Use.

Predictors	$sr^2$	$\beta$	$R^2$
Non-Adherence			
1. Level of pain	.014	-.13	
2. Mistrust in doctor	.036	.21**	
3. Side Effects	.030	.24**	
4. Concern over withdrawal	.052	-.34***	
			.19***
Underuse			
1. Level of Pain	.015	-.14*	
2. Mistrust in doctor	.030	.19**	
3. Concern over withdrawal	.048	-.33**	
			.20***
Overuse			
1. Level of Pain	.002	-.06	
2. Perceived need	.050	.31***	
3. Side Effects	.023	.21*	
			.19***

NOTE. A hierarchical method was used for entry of predictor variables. Dependent variables were Non-Adherence ( $n = 216$ ), Underuse ( $n = 220$ ), and Overuse ( $n = 219$ ). Level of Pain (level of pain at time of completing questionnaire, rated 0 to 10) was forced into each equation in the first step. The subscales from the PMAQ were tested for entry after that based on statistical criteria ( $p$  to enter  $< .05$ ,  $p$  to remove  $> .10$ ).  $sr^2$  refers to the square of the semi-partial correlation coefficient.



\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .